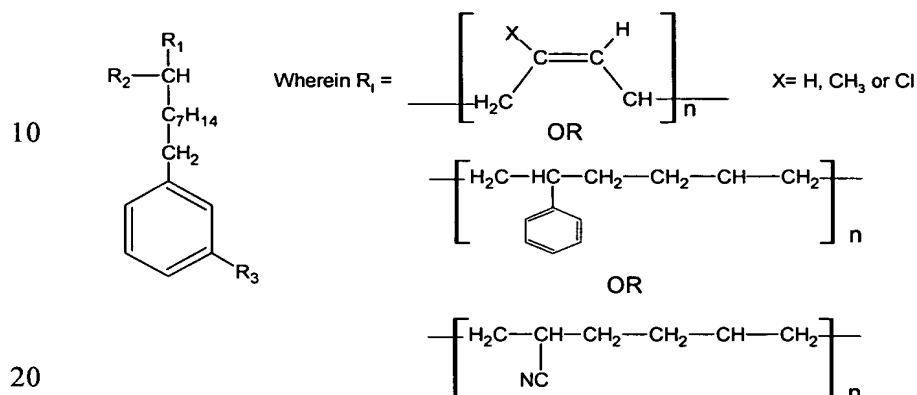


We Claim

1. A novel multi functional additive grafted rubber having the general formula

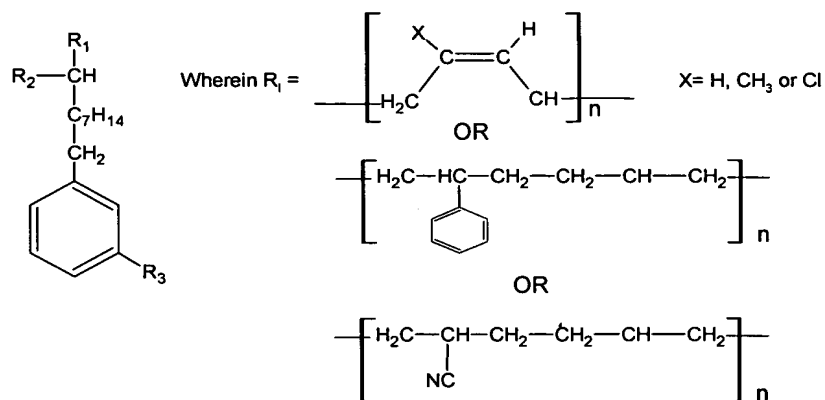


R_2 is selected from C_6H_{13} , C_6H_{11} and C_6H_9

R_3 is selected from OH and H_2PO_4

- 25 2. A novel grafted rubber as claimed in claim 1 has the following characteristics
- g) plasticity in the range of 57-59
 - h) viscosity in the range of 35-43
 - i) superior tensile properties in comparison to natural and synthetic rubber
 - j) better ageing resistance in comparison to natural and synthetic rubber
 - 30 k) higher flame retardancy in comparison to natural and synthetic rubber and
 - l) enhanced cure properties in comparison to natural and synthetic rubber.
3. A novel multifunctional additive grafted rubber as claimed in claim 1, comprises natural rubber or a synthetic diene rubber chemically grafted with cardanol or its phosphorylated derivative.
- 35 4. A novel grafted rubber as claimed in claim 1, wherein the natural rubber used is cis-1,4 polyisoprene rubber.
5. A novel grafted rubber as claimed in claim 1 wherein the synthetic rubber used is selected from the group consisting of styrene butadiene rubber, poly chloroprene rubber, poly butadiene rubber, butadiene acrylonitrile rubber and phosphorylated or chlorinated
- 40 derivatives of cardanol.
6. A novel grafted rubber as claimed in the claim 1 wherein the cardanol used is cardanol isolated from cashew nut shell liquid (CNSL) or commercially available cardanol.
7. A process for the preparation of a novel multi functional additive grafted rubber having the general formula

10



$n = ?$

20 R_2 is selected from C_6H_{13} , C_6H_{11} and C_6H_9

R_3 is selected from OH and H_2PO_4

which comprises grafting natural or synthetic rubber with cardanol or phosphorylated cardanol by solution, solid state or latex grafting, in the presence of free radical initiator, at a temperature in the range of 25-150°C, to obtain the desired product.

25 8. A process as claimed in claim 7, wherein solution grafting of natural or synthetic rubber with cardanol or phosphorylated cardanol comprises reacting CNSL or cardanol or its derivative with syntetic or natural rubber in an organic solvent, in the presence of an initiator, at a temperature in the range of 50-80°C, under stirring, for a period of 8- 20 hrs, followed by precipitating the resultant grafted rubber by adding an organic solvent , drying in vacuum

30 at a temperature of 70-100°C to obtain the desired product.

9. A process as claimed in claim 8, wherein the organic solvent used is methanol

10. A process as claimed in claim 7, wherein solid state grafting of natural or synthetic rubber with cardanol or phosphorylated cardanol comprises reacting CSNL or cardanol/its derivative with rubber in molten stage, in the presence of an initiator, at a temperature of 120-

35 150°C, for a period of 1-2hrs, followed by quenching the above said reaction at a temperature of about 0°C and extracting the desired product by known method.

11. A process as claimed in claim 7, wherein latex grafting of natural or synthetic rubber with cardanol or phosphorylated cardanol comprises reacting CNSL or cardanol or its derivative emulsion with latex, in the presence of an initiator, at a temperature in the range of

40 20-30 °C for a period of about 24 hrs, followed by coagulating the resultant grafted rubber, drying in vacuum, at a temperature of 70-100° C and finally extracting the desired grafted rubber with an organic solvent.

12. A process as claimed in claim 11, wherein the organic solvent used is methanol.

13. A process as claimed in claim 7, wherein the free radical initiator used is selected from benzoyl peroxide and ammonium per sulphate.
14. A process as claimed in claim 7, wherein the natural rubber used is cis-1,4 polyisoprene rubber.
- 5 15. A process as claimed in claim 7, wherein the synthetic rubber used is selected from the group consisting of styrene butadiene rubber, poly chloroprene rubber, poly butadiene rubber, butadiene acrylonitrile rubber and phosphorylated or chlorinated derivatives of cardanol.
16. A process as claimed in claim 7, wherein the cardanol used is cardanol isolated from cashew nut shell liquid (CNSL) or commercially available cardanol.
- 10 17. A process as claimed in claims 7-16, wherein the grafting attained is in the range of 10-60 %.